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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,141	02/11/2002	Rajeev Bajaj	AMAT/6228/CPI/ECP/PJS	6612
32588	7590	02/03/2004	EXAMINER	
APPLIED MATERIALS, INC. 2881 SCOTT BLVD. M/S 2061 SANTA CLARA, CA 95050			WONG, EDNA	
			ART UNIT	PAPER NUMBER
			1753	

DATE MAILED: 02/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/074,141

Applicant(s)

BAJAJ ET AL.

Examiner

Edna Wong

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,4-14,16-24 and 26-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-7,10-14,20-24,28,29 and 31-33 is/are rejected.
- 7) ☒ Claim(s) 8,9,16-19,26,27,30 and 34 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

This is in response to the Amendment dated January 2, 2004. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Response to Arguments

Claim Rejections - 35 USC § 102

I. Claims **1 and 4-6** have been rejected under 35 U.S.C. 102(e) as being anticipated by **Gabe et al.** (US Patent Application Publication No. 2003/0102226 A1).

The rejection of claims 1 and 4-6 under 35 U.S.C. 102(e) as being anticipated by Gabe et al. is as applied in the Office Action dated October 7, 2003 and incorporated herein. The rejection has been maintained for the following reasons:

Applicants state that Gabe et al. does not teach, show, or suggest electroplating solutions having antioxidants therein which combine with free radicals in the electroplating solution to thereby reduce the number of free radicals combining with organic additives. In response, the Applicant has a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA 1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) and MPEP § 2144.

Furthermore, Gabe teaches a similar process which can reasonably be expected that the hydroquinone would have combined with free radicals in the electroplating solution to thereby reduce the number of free radicals combining with organic additives.

Applicants state that as evidence by the Declaration of an inventor of the present application (Exhibit A), the invention of independent claims 1, 11, 20 and 29 was conceived prior to the relevant reference date, and diligently reduced to practice. In response, Applicants' Declaration discloses "Anti-Oxidants" (see item 8, "Describe the invention, preferably with reference to attached drawings" of the Invention Alert Form). It does not appear that the words "Anti-Oxidants" would reduce to practice "an at least one anti-oxidant selected from the group consisting of sodium stannate, hydroquinone, butylated hydroxy toluene, and combinations thereof". Also, it does not appear that the words "Anti-Oxidants" would have led one of ordinary skill in the art to conclude that these words would have meant sodium stannate, hydroquinone, butylated hydroxy toluene, and combinations thereof. Thus, the evidence presented has been fully considered but they are not deemed to be persuasive.

II. Claims **11 and 13-14** have been rejected under 35 U.S.C. 102(e) as being anticipated by **Gabe et al.** (US Patent Application Publication No. 2003/0102226 A1).

The rejection of claims 11 and 13-14 under 35 U.S.C. 102(e) as being anticipated by Gabe et al. is as applied in the Office Action dated October 7, 2003 and incorporated

herein. The rejection has been maintained for the reasons as discussed above.

III. Claims **20-24 and 28** have been rejected under 35 U.S.C. 102(e) as being anticipated by **Gabe et al.** (US Patent Application Publication No. 2003/0102226 A1).

The rejection of claims 20-24 and 28 under 35 U.S.C. 102(e) as being anticipated by Gabe et al. is as applied in the Office Action dated October 7, 2003 and incorporated herein. The rejection has been maintained for the reasons as discussed above.

Claim Rejections - 35 USC § 103

I. Claims **7 and 10** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Gabe et al.** (US Patent Application Publication No. 2003/0102226 A1) as applied to claims 1 and 4-6 above.

The rejection of claims 7 and 10 under 35 U.S.C. 103(a) as being unpatentable over Gabe et al. as applied to claims 1 and 4-6 above is as applied in the Office Action dated October 7, 2003 and incorporated herein. The rejection has been maintained for the reasons as discussed above.

II. Claim **12** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **Gabe et al.** (US Patent Application Publication No. 2003/0102226 A1) as applied to claims 11 and 13-14 above.

The rejection of claim 12 under 35 U.S.C. 103(a) as being unpatentable over

Gabe et al. as applied to claims 11 and 13-14 above is as applied in the Office Action dated October 7, 2003 and incorporated herein. The rejection has been maintained for the reasons as discussed above.

III. Claims **29, 31 and 32** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **Naoi et al.** (US Patent Application Publication No. 2003/0059634).

The rejection of claims 29, 31 and 32 under 35 U.S.C. 103(a) as being unpatentable over Naoi et al. is as applied in the Office Actions dated June 9, 2003 and October 7, 2003 and incorporated herein. The rejection has been maintained for the following reasons:

Applicants state that Naoi et al. does not teach, show, or suggest adding sodium stannate to a plating solution to reduce degradation of organic plating additives in a time varying amount. In response, the Applicant has a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA 1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) and MPEP § 2144.

Naoi et al. does not teach, show or suggest varying nor replenishing the amount

of sodium stannate added in the plating solution during electrochemical plating process, since doing so will alter the final ratio of deposited metal alloy that is desired and the property of the deposited copper-tin alloy layer. In response, the Examiner maintains that it is well within the skill of one having ordinary skill in the art to have replenished that amount of sodium stannate in the solution that is depleted in the plating process and that this would have kept the bath at an optimum performance level during the plating process.

Furthermore, a batch-wise operation would have been obvious in light of the continuous process of the prior art. MPEP § 2144.

IV. Claim **33** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **Naoi et al.** (US Patent Application Publication No. 2003/0059634) as applied to claims 29, 31 and 32 above.

The rejection of claim 33 under 35 U.S.C. 103(a) as being unpatentable over Naoi et al. as applied to claims 29, 31 and 32 above is as applied in the Office Actions dated June 9, 2003 and October 7, 2003 and incorporated herein. The rejection has been maintained for the following reasons:

Applicants state that Naoi et al. does not teach, show, or suggest a method for reducing degradation of organic plating additives in an electrochemical plating solution, comprising adding sodium stannate to the electrochemical plating solution, the sodium stannate being added in an amount corresponding to a time varying amount of

degraded organic plating additives (not sodium stannate) generated in the electrochemical plating solution, wherein the electrochemical plating solution includes an acid in a concentration of between about 5 g/l and about 200 g/l, as recited in claim 33. In response, the Applicant has a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA 1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) and MPEP § 2144.

Furthermore, Naoi teaches an acid in a concentration of between about 5 g/l and about 200 g/l (= 10 g/l of amidosulfonic acid) [page 11, ¶ [0199]].

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter:

Claims **8 and 9** define over the prior art of record because the prior art does not teach or suggest the method of claim 1, wherein the plating solution comprises copper ions, the acid, chloride ions, sodium stannate and at least one organic plating additive as presently claimed.

Claims **16-18** define over the prior art of record because the prior art does not

teach or suggest the method of claim 11, wherein the at least one anti-oxidant is sodium stannate at a concentration of between about 500 ppm and about 5000 ppm.

Claim **19** defines over the prior art of record because the prior art does not teach or suggest the method of claim 11, wherein the plating solution comprises copper ions, the acid, chloride ions and sodium stannate as presently claimed.

Claim **26** defines over the prior art of record because the prior art does not teach or suggest the plating solution of claim 22, wherein the anti-oxidant is sodium stannate at a concentration of between about 500 ppm and about 5000 ppm.

Claim **27** defines over the prior art of record because the prior art does not teach or suggest the plating solution of claim 20, further comprising the copper ions, the acid, chloride ions and sodium stannate as presently claimed.

Claim **30** defines over the prior art of record because the prior art does not teach or suggest the method of claim 29, wherein the concentration of sodium stannate is between about 500 ppm and about 5000 ppm.

Claim **34** defines over the prior art of record because the prior art does not teach or suggest the method of claim 31, wherein the plating solution includes chloride ions in a concentration of between about 10 ppm and about 200 ppm.

The prior art does not contain any language that teaches or suggests the above.

Naoi et al. do not teach sodium stannate at a concentration of between about 500 ppm and about 5000 ppm; and chloride ions.

Gabe et al. do not teach sodium stannate at a concentration of between about

500 ppm and about 5000 ppm.

Therefore, a person skilled in the art would not have been motivated to adopt the above conditions, and a prima facie case of obviousness cannot be established.

Claims 8-9, 16-19, 26-27, 30 and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Citations

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Feldstein et al. (US Patent No. 3,915,717) is cited to teach autocatalytic metal deposition baths stabilized with a stannate (col. 2, Example 2).

Wernlund et al. (US Patent No. 1,919,000) is cited to teach a process for the electrodeposition of metallic tin using a bath having a sodium stannate concentration that may vary from practically zero to the values at saturation of the solution with the same (page 3, lines 85-88).

Oplinger (US Patent No. 1,841,978) is cited to teach a process for the electrodeposition of metallic tin using a bath having a sodium stannate concentration that may vary from practically zero to the values at saturation of the solution with the

same (page 3, lines 85-88).

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

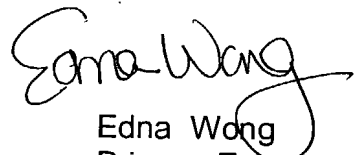
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 5:00 pm, alt. Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or

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proceeding should be directed to the receptionist whose telephone number is (572) 272-1300.


Edna Wong
Primary Examiner
Art Unit 1753

EW
January 29, 2004